MATERIAL SAFETY DATA SHEET

SRM Supplier: National Institute of Standards and Technology
Standard Reference Materials Program
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Gaithersburg, Maryland 20899

SRM Number: 1658a
MSDS Number: 1658a
SRM Name: Methane in Air
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SECTION I. MATERIAL IDENTIFICATION

Material Name: Methane in Air

Description: This SRM mixture is supplied in a DOT 3AL specification aluminum (6061 alloy) cylinder with a water volume of 6 L. Mixtures are shipped with a nominal pressure exceeding 12.4 MPa (1800 psi) which provides the user with 0.73 m^3 (25.8 ft^3) of useable mixture. The cylinder is the property of the purchaser and is equipped with a CGA-660 stainless steel valve, which is the recommended outlet for this nitric oxide mixture. NIST recommends that this cylinder not be used below 0.7 MPa (100 psi).

Other Designations: Methane (marsh gas; methyl hydride; natural gas) in **Air Gas Cylinder**

Chemical Name	Chemical Formula	CAS Registry Number
Methane	CH_4	74-82-8
Air	complex mixture	132259-10-0

DOT Classification: Non-flammable Gas, UN1956

Manufacturer/Supplier: Available from a number of suppliers

SECTION II. HAZARDOUS INGREDIENTS

Hazardous Component	Nominal Concentration	Exposure Limits and Toxicity Data
Methane	1 µmol/mol	simple asphyxiant

SECTION III. PHYSICAL/CHEMICAL CHARACTERISTICS

Methane	Air
Appearance and Odor: colorless and odorless	**Appearance and Odor:** colorless, odorless gas
Relative Molecular Mass: 16.04	**Relative Molecular Mass:** complex mixture
Density: not available	**Density:** 1
Vapor Density (air = 1): 0.555	**Vapor Density (air = 1):** 1
Vapor Pressure (-161 °C): 760 mm Hg	**Vapor Pressure (@ -194 °C):** 760 mm Hg
Freezing Point: -183 °C	**Freezing Point:** -216 °C
Boiling Point: -162 °C	**Boiling Point:** -194 °C
Viscosity (@ 27 °C): 0.01118 cP	**Viscosity (@ 26.85 °C):** 0.01853 cP
Water Solubility (@ 17 °C): 3.5 %	**Water Solubility**: slightly soluble
Solvent Solubility: soluble in ether, alcohol, benzene, and organic solvents	**Solvent Solubility:** not available

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

Methane
Flash Point: -223 °C **Autoignition Temperature:** 537 °C

Flammability Limits in Air (Volume %): **UPPER:** 15
LOWER: 5.0

Unusual Fire and Explosion Hazards: Methane is a severe fire hazard. Vapor/air mixtures are explosive. Vapors or gasses may ignite at distant ignition sources and flash back.

Extinguishing Media: Use extinguishing media that is appropriate to the surrounding fire.

Special Fire Procedures: Fire fighters should wear full protective clothing and self-contained breathing apparatus (SCBA) when this material is involved in a fire. Keep fire cylinders cool with water spray. If possible, stop the product flow.

SECTION V. REACTIVITY DATA

Stability: __X__ **Stable** _____ **Unstable**

Conditions to Avoid: Protect cylinders from physical damage and sources of heat. **DO NOT** store in poorly ventilated areas.

Incompatibility (Materials to Avoid): Methane is incompatible with halogens, oxidizing materials, and combustible materials.

See Section IV: *Fire and Explosion Hazard Data*

Hazardous Decomposition or Byproducts: Thermal decomposition of methane will produce oxides of carbon.

Hazardous Polymerization: _____ **Will Occur** __X__ **Will Not Occur**

SECTION VI. HEALTH HAZARD DATA

Route of Entry: __X__ **Inhalation** __X__ **Skin** _____ **Ingestion**

Methane: Methane is a simple asphyxiant. The symptoms of asphyxia depend on the rapidity with which the oxygen deficiency develops and its duration. In sudden acute asphyxia, unconsciousness may be immediate. With exposures extended over a longer period of time, there may be rapid respiration and pulse, dizziness, reduced awareness, tingling sensations, lack of coordination, and rapid fatigue. As the asphyxia progresses, nausea, vomiting, collapse, unconsciousness, convulsions, and deep coma are possible.

Medical Conditions Generally Aggravated by Exposure: Methane: Not available

Listed as a Carcinogen/Potential Carcinogen:

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens		X
In the International Agency for Research on Cancer (IARC) Monographs		X
By the Occupational Safety and Health Administration (OSHA)		X

EMERGENCY AND FIRST AID PROCEDURES:

Skin Contact: Remove contaminated shoes and clothing. Rinse affected area with copious amounts of water for at least 15 minutes while removing contaminated clothing. Obtain medical assistance if necessary.
Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Obtain medical assistance if necessary.

Inhalation: Immediately remove victim to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen. Lay victim with head and chest lower than hips to improve drainage of fluids from the lungs. Obtain medical assistance.

Ingestion: Not applicable

TARGET ORGAN(S) OF ATTACK: Methane: Not available

SECTION VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken in Case Material is Released: Evacuate and ventilate area. Remove leaking cylinder to exhaust hood or safe outdoor area. Shut off source if possible and remove source of heat. In case of leakage, use SCBA.

Waste Disposal: Dispose of gas into an adequate amount of alkaline potassium permanganate solution. Dispose of non-refillable cylinders in accordance with federal, state, and local regulations. **DO NOT** return the empty cylinder to the supplier.

Handling and Storage: Secure cylinder when using to protect from falling. Use suitable hand truck to move cylinders. Wear safety shoes when handling cylinders. Use adequate general and local exhaust ventilation to maintain concentrations below exposure limits and to avoid asphyxiation. A chemical safety shower and an eyewash station must be readily available. For protection of eyes, wear safety glasses.

> **NOTE:** Contact lenses pose a special problem; soft lenses may absorb irritants and all lenses concentrate them. **DO NOT** wear contact lenses in the lab.

Store in well ventilated areas away from combustibles. Keep valve protection cap on cylinders when not in use.

SECTION VIII. SOURCE DATA/ OTHER COMMENTS

Source: MDL Information Systems, Inc., MSDS *Methane,* 11 December 2001.
MDL Information Systems, Inc., MSDS *Compressed Air, Breathing Air,* 11 December 2001.

Disclaimer: Physical and chemical data contained in this MSDS are provided for use in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references, however NIST does not certify the data on the MSDS. The certified values for this material are given only on the NIST Certificate of Analysis.